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Ecological macroeconomics – calling for a shift from consumption to investment

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Introduction

The economic downturn starting in 2008 opened a window of opportunity for the discussion on how to combine macroecononomic and environmental concerns. This discussion is far from new, as evidenced, for instance, by the European Commission's White Paper from 1993 which explained how a greening of the economy could go hand in hand with increased employment (European Commission 1993). These ideas were not much reflected in actual policies, and – despite some green elements – the subsequent economic upturn was first of all driven by consumption and in several OECD countries fuelled by credit expansion. The present revival of the discussion includes contributions from several actors on Green New Deal etc. (Schepelmann et al. 2009, The Green New Deal Group 2008), repeating the idea that the promotion of green innovation and government funding of greener infrastructure would improve competitiveness and increase employment.

This time the "Green Keynesianism" is accompanied by more theoretical debate and increased interaction between the heterodox schools of ecological economics and Post Keynesian economics (Victor 2008, Jackson 2009, Harris 2009)(Harris, Goodwin 2009, Holt et al. 2009)(Pollitt et al. 2010). Also, both the degrowth community and the research community focusing on sustainable transitions of socio-technical systems contribute to the debate on how to reconcile environmental and social concerns (Schneider et al. 2010, Martinez-Alier et al. 2010, Grin et al. 2010). Based on this broad variety of pieces in a jigsaw puzzle, a new ecological macroeconomics is emerging, but the contours are still vague. The intention with this paper is to outline some of these contours and to add a few pieces to the puzzle by discussing the need for shifting resources from consumption to investment and the role of consumer-citizens in this shift.

The paper starts by listing the problems and challenges which an ecological macroeconomics should deal with, and the following section outlines some of the shortcomings of traditional macroeconomics and the requirements related to the development of a new theoretical framework. Despite the complexities of formulating a new framework, most contributors agree on one important issue, dealt with in the third section: the need to shift from consumption to investment in order to transform the socio-technical systems related to energy, transport, housing, food, and so on. The fourth section briefly outlines the roles of consumer-citizens in relation to such sustainability transformations, and the final section considers the possibilities for initiating the changes.

What goals should an ecological macroeconomics deal with?
Traditionally, 'macro' in macroeconomics refers to the national level: the theories – whether Keynesian or monetarist or some other 'breed' – are first of all applied as a basis for managing national economies. This makes good sense when "the common good" is mainly conceived in a national perspective, and when the possibilities for taking action are anchored in the nation states. The traditional concern for macroeconomic theory is thus the "health" of the national economy: keeping up a "reasonable" economic growth, securing employment, avoiding long-term public deficits, inflation and balance of payments deficits that build up foreign debt and threaten the currency.[1] Other political issues, like social concerns and care for the environment, are handled within the framework of these general concerns.

The possibilities for national economies to stay healthy depend on the international institutional framework, but this does not change the national focus. Although international institutions act at a supra-national level, they are exactly inter-national and formed as the path-dependent results of power relations between nation states (consider e.g. the establishment of the Bretton Woods institutions after WWII). Still, international institutions only to a very limited extent embody a global perspective on "the common good" and challenge the predominantly national focus.

Since environmental problems increasingly call for a global perspective when conceiving "the common good", an ecological macroeconomics has to take a global perspective on 'macro'. But at least for a foreseeable future, this must happen within a framework where most political power is still anchored at the national level. The global perspective thus calls for a redefinition of what is meant by a healthy national economy.

The core challenges and problems at the global and national levels can be translated into the goals that an ecological macroeconomics should deal with. At the global level, at least five main groups of challenges can be identified:

- Environmental challenges: climate change, destruction of ecosystems, overuse of core resources like land, water and phosporus, the use problematic chemicals.
- Poverty and large inequalities, large-scale migration.
- Security: shifting global power relations implies instability. While this can be seen as a positive development, it may increase social and military conflicts, not the least when combined with resource scarcity.
- Global economic crises, instability of the financial system, sudden break-down, large-scale unemployment.
- The complexity of the global interrelationships presents a problem in itself. The prevailing institutions and mechanisms generate the problems mentioned above – destroy the environment, transfer resources from poor to rich – and they do so in ways so complex and subtle that both understanding and transformation is harder than 'just' challenging vested interests.

Translating some of these challenges into goals in a national context, using Denmark as an example, would imply a high priority to the issue of scale and distribution: the appropriation of resources for consumption in Denmark ought to be gradually reduced to make room for more consumption in poor countries and to contribute to a global redistribution. Data on the climate change issue, as well

[1] The general concerns differ for the US super-power where military expenses have priority and the role of the dollar has enabled cheap funding of balance of payments deficits.

as data on material flows and land use, illustrate that this challenge is enormous and that the size of the challenge particularly depends on the extent to which one wants to deal with global redistribution (Jackson 2009). When global redistribution is considered to be a necessary ethical concern, increased technological efficiency will not be sufficient to make room for others' consumption. Resource-using economic activity will have to go down, and the challenge is to reconcile this with the achievement of other important societal goals.

A core goal should be to ensure the fulfilment of basic needs for all members of society, including a social position that makes it possible to be acknowledged for contributing to society. In modern societies this goal is often formulated as full employment in the formal economy, but this may have to be redefined. Simultaneously, relative economic economic stability is needed to avoid events where people are driven from house and home. In a small economy with few natural resources, economic stability and reasonable living standards depend on imports and thus on the ability to export goods and services. Keeping up this ability is an important goal, but it should be combined with a goal of reducing dependency on imports to reduce complexity, national vulnerability and environmental pressures. In addition to global redistribution, an important goal should be the gradual reduction of inequalities within the country because this reduces social tensions and increases welfare.[2]

In mainstream economics many of these nationally based societal goals are condensed in the goal of economic growth: ever growing GDP is expected to ensure full employment, better living standards for most people, economic stability, and the reduction of social tensions. The challenge of dealing with climate change (which is usually seen as the main environmental problem) is thus formulated as the need to decouple GDP growth from CO_2 emissions, and win-win solutions are expected to take us a long way, since technological innovation may contribute to both emission reductions and economic growth. The challenge is of manageable size as long as the rebound effect is downplayed and, even more important, the need for global redistribution is not taken into account.

Ecological economists question this way of formulating the problem because they, like many others, question the relationship between GDP and wellbeing (Stiglitz et al. 2009), and even argue that GDP is best given up as a relevant measure of anything (van den Bergh 2009). But giving up GDP does not change the need for reconciling the national goals related to wellbeing with the goal of preventing climate change, and since ecological economists cannot set aside the rebound and the distribution issue, the challenge is much larger than usually conceived by mainstream economists. To face this challenge, considerable transformations of both socio-technical systems and institutional structures are needed. Fossil energy must be replaced by renewable energy, ecosystems must be restored, systems of provision related to energy, food, housing, transport, health care etc. have to be transformed, and economic mechanisms allocating resources and distributing goods must be changed. To discuss these issues in an overall perspective, and not only as separate problems, a new ecological macroeconomics is needed.

The challenge of formulating an ecological macroeconomics

Since an ecological macroeconomics redefines what is meant by a healthy national economy, it calls for new ways of theorising or modelling the economy to analyse trade-offs and policy impacts. Traditionally, macroeconomics has not dealt with environmental issues, and environmental

[2] In addition to such general goals, different countries face specific challenges. For instance, in a Danish context, it would be useful from an ecosystem perspective to reduce the high population density over time, and the present ageing population may be seen as an opportunity for a gradual demographic transformation towards a smaller population.

economics is basically a microeconomic field. The introduction of satellite accounts (in relation to national accounting) on energy use and various emissions as well as physical input-output tables have made it possible to include environmental aspects in macroeconomic modelling, but this is mainly used for specialised studies that are added on to traditional analysis. Dealing with scale and distributional issues is not a common part of macroeconomic analysis, and there are considerable obstacles to the use of macroeconomic reasoning in relation to transformation processes. In the following some of the problems related to the use of traditional macroeconomic models for the purpose of ecological macroeconomics are outlined, and consequently, some requirements for a new ecological macroeconomics are formulated.

Firstly, as already mentioned, macroeconomic models are based on a nationalistic perspective. It is not visible in which ways and to what extent the national economy depends on foreign resources and the use of global absorptive capacity for emissions. Macroeconomic analysis ought to include two perspectives on resource use: a production perspective highlighting the use of resources in national production and a consumption perspective capturing the appropriation of resources for national consumption (private and public). Highlighting the import dependency and environmental load displacement is important.

Secondly, macroeconomic models are built around the concept of GDP. As often pointed out, GDP is basically a measure of activities in the formal economy, and it is not really a relevant measure for any of the concerns of ecological macroeconomics. GDP mixes up costs and benefits, does not reflect the run-down of natural resources, does not correlate with wellbeing, and so on. In addition, GDP as a monetary measure is not very informative. Everything is added according to market value (or imputed value), independently of the character of the concrete activities being added. A distinction is made between consumption and investment, but it is not relevant for the functioning of the model whether investments are made in wind turbines or coal-fired power plants. From an environment and transformation perspective, however, the concrete activities are decisive: it is not possible first to create GDP and afterwards find out how to spend the money, for instance, for welfare or environmental improvements. This is possible in a household's private economy, but at the macro level the process is simultaneous: we only get, for instance, welfare services if these are part of the activities included in GDP. The character of the output, the distribution of goods and services, as well as trade relationships are constituted in the process – embedded in the baking of the 'cake'. An ecological macroeconomics needs to focus on the character of the concrete activities, that is, how they contribute to the transformation processes and the important societal goals. Jackson (2009) emphasises this point when he suggests to distinguish between various categories of investment.

Thirdly, economic models are formulated in traditional economic terms – supply and demand, prices and quantities – and causal relationships are formulated as relationships between such variables. All sorts of transactions and relationships involve aspects of nature – flows of energy and materials – but these only exist as a hidden layer below the monetary relationships. When economists calculate something 'in real terms', they just mean to consider a trend adjusted for inflation. In relation to the financial crisis, they may also refer to the real economy as the actual production of goods and services to distinguish it from the financial economy, which has completely outgrown the transactions in the real economy. However, as Kallis et al. point out, economists do not consider the real-real economy – the biophysical metabolism connected to economic processes (Kallis et al. 2009). An ecological macroeconomics must deal directly with natural flows and not only include them as add-on satellites. For instance, it should be clear that

when resources are spent for increased consumption of the rich, they cannot, at the same time, be used for system transformation or for improving the living conditions of the poor. Economic models tend to disguise this fact since money may multiply without limits. Traditional reasoning would argue that economic benefit urges the high-income groups to work more and thus to create a larger GDP, which would also benefit the poor. But this only makes sense if resources are unlimited; when they are not, the economic carrot just gives high-income groups access to appropriate more resources and to undermine the future living conditions for everybody.

Fourthly, macroeconomic models are based on given institutions. Minor institutional changes may be analysed in the models, such as changes of pension schemes, unemployment benefits or tax rates, but the transformations needed to cope with the large challenges would involve more radical institutional changes – implying changes of the causal relationships. An ecological macroeconomics thus needs to open up the discussion on institutional changes. Presently, many sensible political measures are 'shot down' because they would create problems within the given institutional framework, and this may call for changes of the framework rather than giving up the measure. Free movement of capital across borders is an example of an institutional framework that limit the political space of action. When Denmark embarked on the liberalisation process, the deregulation was thus nicknamed "insurance against socialism" because it would make socialist-inspired policies impossible; for instance, increased taxation of capital gains would encourage capital to leave the country and threaten the currency. To make progress towards sustainability it is surely necessary to abolish the financial markets as the superior judge regarding the availability of policy options. Likewise, it would be useful to understand and transform the institutions that are decisive for maintaining high profit expectations – maybe breaking up large firms would be useful to reduce power concentrations (Korten 2009). Another example of political-economic mechanisms that make sensible change difficult, relates to the vulnerability of pension systems and systems for housing loans; such systems call for institutional changes to diminish risks in order not to present obstacles to measures that may reduce economic growth (Seidl, Zahrnt 2010).

In general, the concerns emerging from the basics of the real-real economy may conflict with the institutional set-up of the economy. Take the example of young people who decide to live at a low level of income, for instance, by combining part-time work and educational activities for a long period of time. From an environmental perspective, it is positive that they spend few resources and maybe delay having kids, but on the other hand, there is considerable pressure to encourage young people to finish their education quickly so they can earn more money and pay higher taxes to fund the welfare state. Of course, in the long run citizens cannot, on average, command more services from the welfare state than it is possible to fund (which is presently the case in Denmark), but it is highly problematic when the funding depends on encouraging resource-intensive lifestyles. An ecological macroeconomics ought to be able to highlight such conflicts and consider how institutions may be changed.

Fifthly, macroeconomics is weak with regard to technology and innovation. Technological change is blackboxed, and socio-technical systems are not thematised at all. This is problematic because it would be useful to conceive of resource use as emerging from the functioning of socio-technical systems rather than from the traditional statistical categories of production and consumption. Consumption and production are interwoven in socio-technical systems, and the dynamics of these systems are decisive for resource use (Elzen et al. 2004, Kemp, van Lente 2012). For instance, the food system includes the interplay between agricultural production, methods of cultivation, husbandry, provision of inputs for agriculture, industrial processing of food, distribution systems,

trade relationships, diets, and so on. The system is extremely complex and provides a large catalogue of disasters: homogenisation and loss of biodiversity, diffusion of phosphorus, net use of energy (which is absurd in a process involving photosynthesis), eutrophication, maltreatment of animals, diffusion of pesticides, destruction of ground water and water courses, resistent bacteria due to overuse of antibiotic, bad working environment, food-related health problems, obesity, hunger, outselling poor farmers in developing countries, enormous waste of food, and so on. Obviously, there are large vested interests in maintaining this system, and it is legitimised by accounts of the system as high-productivity agriculture, effectively providing high-quality food for the growing world population. Traditional macroeconomic reasoning only captures the contribution of agriculture to GDP and the balance of payments. In the Danish case, agriculture and related industries are usually considered to provide positive contributions to the overall health of the economy in spite of the basic malfunctioning of the food system (presently, the sector has considerable economic problems, but this has not lead to problematisation of the system as a whole). An ecological macroeconomics must take into account the functioning of socio-technical systems, including their interplay (e.g. between the energy, food and transport systems), since they are decisive for the overall health of the economy. The theoretical framework should also open for considering whether some general guidelines are relevant for transformations of the socio-technical systems, such as localisation and complexity reduction.

Although an ecological macroeconomics along the lines outlined above is not in place as a systematised framework, researchers sharing these ideas come up with suggestions regarding how to handle the multiple crises we are facing. The next section deals with a particular aspect of these suggestions which is advanced by many contributors, namely the need for shifting resource use from consumption to investment (see also (Harris 2012)).

The shift from consumption to investment

The point of departure is the need for reducing society's overall resource consumption (and related CO_2 emissions etc.) and for restoring degraded ecosystems. In principle, this could be done by scaling down the level of activity and the standard of living within the framework of existing socio-technical and economic systems, but this option is not very attractive. To reconcile environmental improvements with other social aims, system transformation is decisive – including transformed systems for energy, transport, food, housing etc. Such large-scale transformations require resources, and since the same resources cannot be spent twice in the real-real economy, consumption will have to make way for investments. In a traditional Keynesian model natural resources do not constitute a limitation and investments can increase GDP and through the multiplier effect consumption as well, until full employment gives rise to wage push and problems with competitiveness. But from the perspective of ecological macroeconomics, limits to resource use have to be enforced, and unless large improvements of resource-efficiencies are achieved through the investments, consumption possibilities will be reduced.

In programmes for green growth, consumption is often expected to continue increasing. Take, for instance, the plan from the Danish Climate Commission, which outlines how Denmark by 2050 can become independent of fossil fuels and meet the target of reducing greenhouse gases by 80-95% compared with 1990 (Klimakommissionen 2010)(Richardson 2011). The terms of reference of the commission stated that this should be achieved simultaneously with continued economic growth and increased transport. The main elements of the plan are energy savings, not the least in relation to housing, a considerable increase in the use of wind energy for the provision of electricity, also to be applied for heating and transport, and the use of biomass as the most important system backup

(the commission suggests that the use of biomass should be kept within the limits of the national production capacity with unchanged food production, since it will become a scarce and probably expensive resource in the future; a scenario based on more biomass is also presented). This conversion of the energy system will require considerable investments in offshore wind turbines, electric cars, heat pumps, energy renovation of buildings, and electricity infrastructure, but the Commission argues that this is compatible with increasing living standards – more cars, more housing space, more appliances. They assume that GDP will more than double from 2008-2050 and calculate that the long-term additional costs of the conversion will be in the order of 0.5% of GDP in 2050. The low costs reflect that the reference scenario assumes increasing prices of fossil fuels and increasing costs of CO_2 quotas, which means that it will also be expensive not to convert the energy system. Although consumers will have to contribute to the investments in various ways – paying other actors as well as investing themselves – they are still expected to be much better off due to economic growth.

Before criticising this result from an ecological economic perspective, it should be noted that the Commission maybe pass lightly over the implications for consumption even within a traditional modelling framework. If the growth of GDP involves an increasing share of investment, consumption does not grow as fast as GDP, and in addition, part of consumption may become tied to specific consumption categories that some consumers do not exactly find desirable, such as insulation, heat pumps, and electric cars. Seen from the perspective of political legitimacy, investment-based GDP growth may serve the goal of increased employment, but may not fulfil the expectations regarding increasing consumption. Historically, the share of investment in GDP has been higher in previous phases of economic development, and in quickly developing, more or less planned economies the share has been very high – and still is, for instance, in China. But sooner or later the population asks for benefitting more from growth in the form of increased consumption, and the investment rate tends to go down, like it is now planned to do in China. Whereas high investment rates seem to be acceptable in periods of fast industrialisation when people have not yet got used to high and growing consumption – and in periods of war – it is a new challenge to reverse the trend and convert a consumption-driven to an investment-driven economy. Sometimes it is argued that economic growth is decisive for the political legitimacy of sustainability transformations, but it may be questioned whether employment is sufficient if not combined with the habitual consumption increases over time.

Turning to the ecological economic critique of the Commission's idea that consumption can continue to increase, it should be noted that their result, basically, depends on two assumptions. First, the assumption of unlimited natural resources within the traditional modelling framework is maintained: fossil fuels are replaced by the resources needed for producing the wind turbines, the electric cars and all the other gear needed for the transformation (including e.g. rare earth minerals that are core to renewable energy technologies). Second, the plan only concerns the Danish responsibility in relation to national production: there is no mention of the need to bring down the Danish share of appropriated resources globally. Therefore, it is not considered problematic that much of the equipment needed for the conversion as well as the increasing amounts of consumer goods will be imported and probably produced by the use of fossil fuels and other resources elsewhere. When the limited resources and the global responsibility are taken into account, it is hard to see how increased investment can take place without reducing consumption – or at least hampering the growth of consumption.

The next question concerns how resources are actually directed towards investment instead of consumption. As Jackson (2009) emphasises, some of the transformative investments are not profitable for private investors. Of course, investments and green innovation may be encouraged and made more profitable by taxing energy and other resources or emissions, but since the impacts of large price increases over a short period of time may be disruptive to the economy in other ways, it is difficult to make private investments profitable in the short term. Price signals are necessary, but they are better phased in gradually and complemented by many other instruments, including planning and public investment.

In addition to signalling, green taxes may contribute to funding of public investments, which is one of the ways in which consumers pay. The organisation of consumers' payment is decisive for the distribution of the burden, for instance, if pension funds are mobilised through legislation, part of the burden would fall on future pensioners who would get lower pensions due to the lower return on funds. When placing the burden, it is important to protect the fulfilment of basic needs, including access to health care and education for everybody. This view implies that private consumption should bear the brunt of the transformation – less travelling, electronic gadgets, meat, housing space etc. Furthermore, it implies that high-income earners have to pay a relatively larger share – thus turning the trend in the opposite direction of what has been dominant for some time.

Consumption reduction is already on its way for large groups in the rich countries because of the economic crisis and the tough global competition and labour migration that undermine the power of labour unions and lead to lower wages and deteriorating working environment. The competitive pressure is increasingly diffused also to groups with higher education, and the balance of power shifts even more in favour of employers. In a global perspective these forces work as equalising for large groups of employees, but they increase misery in the rich countries and go hand in hand with increased inequality within countries, favouring profits and higher incomes for the privileged few. Furthermore, this redistribution does not provide resources for systemic sustainability transformations, but rather for extreme luxury consumption. The undesirability of this scenario emphasises the need for an orderly and balanced shift from consumption to investment.

The role of consumer-citizens

As emphasised above, system transformations are decisive to reconcile environmental improvements with other social aims, and this section considers the role of consumers in these transformations and in the more general institutional transformation of the economy. Obviously, the transformations call for much more than the traditional role of the green consumer as somebody who chooses green products and abstain from particularly resource-demanding practices. Consumers may have to develop further their roles as investor-consumers, prosumers (producer-consumers), cooperators and providers in the informal economy, contributors to the government budget, system actors and change agents. From a practice theory perspective it could be argued that various practices need to be strengthened considerably (Shove, Spaargaren 2012).

In the plan of the Danish Climate Commission and related plans (Energinet.dk, Dansk Energi 2010), the role of consumers is conceptualised in relatively traditional ways (Nyborg, Røpke 2011). The large increase in the use of wind energy is based on large-scale offshore wind farms, the extension of transmission cables to neighbouring countries, and the establishment of a complex smart grid system to introduce demand management. The conversion of the energy system is planned to take place completely within the formal economy and depends on public regulation of the process. As mentioned, the material standards for consumers are expected to increase, and the

role of consumers is conceived as relatively passive: they are expected to react on price incentives that will make insulation, electric cars and heat pumps attractive investments (microgeneration at household level plays a marginal role). The plan does not rely on enthusiastic engagement on the part of citizens developing new solutions in the informal economy or cooperating locally, but they are expected to become a sort of investor-consumers by self-interest. Consumers are also expected to accept demand management, but planners hope to introduce it in ways that interfere as little as possible with consumers' customary everyday life and standards.

A more radical perspective is outlined in Juliet Schor's book *Plenitude* where she focuses on more local systems and more informal economy with high tech self-provisioning (Schor 2010). The dynamic behind the sustainability transformation, which Schor detects, arises from the economic crisis that makes many people redundant in the formal economy. These people have to find a living, and they may become entrepreneurs in a growing informal economy that focuses on self-provisioning and strengthens the socio-economic links within local communities. New advanced technologies, such as the so-called fab labs where 3-D printers can produce all sorts of products based on "recipes" from software developers, can make the informal economy as well as small businesses highly productive. The sustainability of this vision is connected to increased localisation, less complexity and transport, and the acceptance of lower (or at least not increasing) material standards in exchange for more time and closer social relationships in the local community. While Schor emphasises the bottom-up perspective on social change, she also mentions the need for government regulation to raise the cost of energy and thus encourage green innovation.

The idea of localisation as a core element in sustainability transformations is recurrent in the degrowth debate and elsewhere. It is worth noting, however, that Schor's idea of self-provisioning still relies on the use of microprocessors and several other technologies that can hardly be provided by the fab labs themselves, and raw materials for high tech are seldom locally available. It can also be questioned whether local systems are necessarily more sustainable. For instance, the energy return on investment (EROI) may be much higher for bigger wind turbines than for small.

In Schor's perspective consumer-citizens are entrepreneurs for the new economy, and they cooperate locally, rather than just acting at household level. In general, local solutions may be more effective in mobilising citizens and in making increased efforts, inconvenience or costs more acceptable (Hielscher et al. 2012). Local solutions seem to call for more public engagement and to appeal to citizen responsibility rather than consumer interests, in particular, in local communities where sustainability concerns go hand in hand with concerns for the economic survival of the community (Späth, Rohracher 2010). In Denmark, this is obvious in some islands and other peripheral areas where ambitious local energy projects are carried out, but in many areas in modern societies, the notion of local community does not make sense to people, because there is little inner coherence and contact between the inhabitants, and people are mostly oriented towards activities that are not local. Localisation as a more generally applicable strategy may thus face considerable challenges.

A related aspect of more sustainable consumer-citizens concerns labour time. In the degrowth debate, it is often stated as obvious that the number of working hours in the formal economy must go down: continued technological change will increase labour productivity, and since continued economic growth is impossible for environmental reasons, we should share the decreasing work load and the income from the formal economy. More work could be done in the informal economy with less resource-demanding activities related to, for instance, care, culture and labour-intensive

self-provisioning of food, and more time could be left for leisure. Increased leisure is often seen as an essential part of a more sustainable life, envisioning consumer-citizens to become more relaxed. While this sounds attractive, it may not be realistic in an economy investing in change rather than just bringing down consumption. More work may be needed in relation to the transformation of socio-technical systems in energy, transport, food, housing etc., and the running of the reformed systems may become more labour-intensive. This possibility is all the more probable, since rising prices on energy and materials will redirect the focus of innovation towards increasing energy and materials productivity rather than labour productivity. Furthermore, the demographic challenge facing many industrialised countries may militate against a shorter working week and eventually call for a higher pension age.

While more leisure is not as obvious a part of sustainability transformations as it is often suggested (at least not in countries with relatively short working weeks and long holidays), the work may partly shift to the informal economy – depending on the organisation of socio-technical systems and socio-economic institutions. The macroeconomic implications of a shift towards increased reliance on the informal economy may be complex. A relative increase in the informal economy may give rise to difficulties in relation to the funding of the welfare state, because more activities take place without being taxed. For instance, visions of strengthened local economies sometimes include the introduction of local currencies which may imply the avoidance of taxation of value added. Likewise, it may become more complicated to organise a certain equalisation of incomes through the government budgets, if taxation becomes more difficult. New taxpayer roles may have to be developed.

While all these roles are or can become important, the role of making transformations politically legitimate is decisive. Unfortunately, as the following concluding remarks suggest, this will not be an easy task.

A window of opportunity?

As mentioned in the beginning of this paper, the economic downturn starting in 2008 opened a window of opportunity for the discussion on how to combine macroeconomic and environmental concerns. Presently, there is widespread acceptance of the importance of both the climate change issue and the need for establishing economic stability, and the idea of bringing the two issues together is often aired. The dominant perspective of the integration, however, is to return to economic growth and to use the climate change issue as a stepping stone for national competitiveness by developing strong positions in various green technologies. Roughly speaking, this perspective includes two lines. The traditional Right wants to improve national competitiveness by clipping the wings of the labour unions, reducing taxes and cutting down welfare services, and to encourage environmental innovation by relatively minor government signals, leaving the rest to the market; demand is expected to come from China and other rapidly growing economies, and when domestic growth picks up, from increased domestic employment. The traditional Left, supported by parts of industry, goes for the Green New Deal where government intervention ensures a market for green technologies and welfare technologies in order to improve, simultaneously, environment, welfare, competitiveness and employment. This line tries to turn the trend of deepening domestic inequalities and to keep up domestic demand and social stability.

While the left-wing perspective is, surely, the most promising from an ecological economic perspective, it is still far from facing up to the challenge. It does not question the need for classic economic growth in the rich countries, and investments are not expected to hamper consumption

growth, except for the very rich. Basically, biophysical limits are not acknowledged, and the need for global redistribution is not addressed. At an abstract level, it is not difficult to understand why. The process towards taking on more global responsibility involves risks and dilemmas in relation to the national position in global competition: high living standards and good employment possibilities depend on producing the goods and services that allow a high remuneration – and thus allow the transfer of resources from others. Lacking behind implies the risk of high unemployment and a self-fuelling downturn – and the risk of ending up among the exploited. This is the classical 'Easter Island dilemma': giving up erecting statues would serve the common good, but imply the risk of losing the battle altogether, and the privileged in the established society would lose their position (Ponting 1991). Or, as Andersson and Lindroth formulates the dilemma for the core countries in international trade: "A large footprint may be a condition for the preservation of their status vis-à-vis actual and potential rivals. Therefore, they may fear that to make ecological footprint reduction a priority can be used by less conscientious competitors. The laudable effort might end in a falling status and in eventually becoming a victim of ecologically unequal exchange" (Andersson, Lindroth 2001)(p. 121). The dilemma is exacerbated by the globally integrated financial system where the first steps towards, for instance, restricting profits may lead to outflow of capital and threats to currency stability. Likewise, limiting high incomes may encourage important specialists to migrate. As Victor (2008: 221f) says, it may not be easy to manage without growth in one country.

Anyway, the shift from consumption to investment has to start in individual countries, and experiments are highly needed. For some time, it will be necessary to rely on the complementarity between bottom-up initiatives and government intervention along the lines of a Green New Deal. In the meantime, the work on ecological macroeconomics can contribute to the long-term change of discourse.

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